**Hewlett-Packard Company**

ProLiant BL460c Gen9
(2.30 GHz, Intel Xeon E5-2699 v3)

<table>
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<tr>
<th>SPECfp®2006</th>
<th>SPECfp_base2006</th>
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<tr>
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</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon E5-2699 v3
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.60 GHz
- **CPU MHz:** 2300
- **FPU:** Integrated
- **CPU(s) enabled:** 36 cores, 2 chips, 18 cores/chip
- **CPU(s) orderable:** 1.2 chip
- **Primary Cache:** 32 KB I + 32 KB D on chip per core
- **Secondary Cache:** 256 KB I+D on chip per core

**Software**

- **Operating System:** Red Hat Enterprise Linux Server release 7.0 (Maipo) Kernel 3.10.0-123.el7.x86_64
- **Compiler:** C/C++: Version 15.0.0.090 of Intel C++ Studio XE for Linux; Fortran: Version 15.0.0.090 of Intel Fortran Studio XE for Linux
- **Auto Parallel:** Yes
- **File System:** xfs

**Test Details**

- **CPU2006 license:** 3
- **Test sponsor:** Hewlett-Packard Company
- **Tested by:** Hewlett-Packard Company
- **Test date:** Oct-2015
- **Hardware Availability:** May-2015
- **Software Availability:** Sep-2014
Hewlett-Packard Company

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SPECfp2006 = 107
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L3 Cache: 45 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (8 x 32 GB 2Rx4 PC4-2133P-R)
Disk Subsystem: 1 x 400 GB SAS SSD, RAID 0
Other Hardware: None

System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other Software: None

Results Table

<table>
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<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>seconds</th>
<th>Ratio</th>
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<td>291</td>
<td>67.1</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
Transparent Huge Pages enabled with:
echo always > /sys/kernel/mm/transparent_hugepage/enabled

Platform Notes

BIOS Configuration:
Intel Hyperthreading Options set to Disabled
HP Power Profile set to Custom
HP Power Regulator set to HP Static High Performance Mode
Minimum Processor Idle Power Core State set to C6 State
Minimum Processor Idle Power Package State set to No Package State
Energy/Performance Bias set to Maximum Performance
Collaborative Power Control set to Disabled

Continued on next page
Hewlett-Packard Company

ProLiant BL460c Gen9
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SPECfp2006 = 107
SPECfp_base2006 = 101

CPU2006 license: 3
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Platform Notes (Continued)

QPI Snoop Configuration set to Home Snoop
Thermal Configuration set to Maximum Cooling
Processor Power and Utilization Monitoring set to Disabled
Memory Refresh Rate set to 1x Refresh

Sysinfo program /cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on BL460c-Gen9-cpu2006 Fri Oct 2 09:49:18 2015

This section contains SUT (System Under Test) info as seen by
some common utilities. To remove or add to this section, see:
http://www.spec.org/cpu2006/Docs/config.html#sysinfo

From /proc/cpuinfo
model name : Intel(R) Xeon(R) CPU E5-2699 v3 @ 2.30GHz
  2 "physical id"s (chips)
  36 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The
following excerpts from /proc/cpuinfo might not be reliable. Use with
caution.)
cpu cores : 18
siblings : 18
  physical 0: cores 0 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
  physical 1: cores 0 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
  cache size : 46080 KB

From /proc/meminfo
MemTotal: 263844192 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux Server"
    VERSION="7.0 (Maipo)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="7.0"
    PRETTY_NAME="Red Hat Enterprise Linux Server 7.0 (Maipo)"
    ANSI_COLOR="0;31"
    CPE_NAME="cpe:/o:redhat:enterprise_linux:7.0:GA:server"
  redhat-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
  system-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
  system-release-cpe: cpe:/o:redhat:enterprise_linux:7.0:ga:server

uname -a:
Linux BL460c-Gen9-cpu2006 3.10.0-123.el7.x86_64 #1 SMP Mon May 5 11:16:57 EDT
2014 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Oct 2 09:48

SPEC is set to: /cpu2006

Continued on next page
Platform Notes (Continued)

Filesystem     Type  Size  Used  Avail  Use%   Mounted on
/dev/sda4      xfs    368G   74G   294G  20%    /

Additional information from dmidecode:

Warning: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

BIOS HP I36 05/06/2015
Memory:
8x UNKNOWN NOT AVAILABLE
8x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2133 MHz

(End of data from sysinfo program)

Regarding the sysinfo display about the memory installed, the correct amount of memory is 256 GB and the dmidecode description should have one line reading as:
8x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2133 MHz

General Notes

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact,1,0"
LD_LIBRARY_PATH = "/cpu2006/libs/32:/cpu2006/libs/64:/cpu2006/sh"
OMP_NUM_THREADS = "36"

Binaries compiled on a system with 1x Core i5-4670K CPU + 16GB memory using RedHat EL 7.0

Base Compiler Invocation

C benchmarks:
icc  -m64

C++ benchmarks:
icpc  -m64

Fortran benchmarks:
ifort  -m64

Benchmarks using both Fortran and C:
icc  -m64 ifort  -m64

Base Portability Flags

410.bwaves:  -DSPEC_CPU_LP64

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Hewlett-Packard Company
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Tested by: Hewlett-Packard Company

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Hardware Availability: May-2015
Software Availability: Sep-2014

Base Portability Flags (Continued)
416.gamess: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64 -nofor_main
436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.dealII: -DSPEC_CPU_LP64
450.soplex: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64 -nofor_main
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
482.sphinx3: -DSPEC_CPU_LP64

Base Optimization Flags
C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
-ansi-alias

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
-ansi-alias

Peak Compiler Invocation
C benchmarks:
icc -m64

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
icc -m64 ifort -m64
# SPEC CFP2006 Result

## Hewlett-Packard Company

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## Peak Portability Flags

Same as Base Portability Flags

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## Peak Optimization Flags

### C benchmarks:

- `433.milc`: `-xCORE-AVX2` (pass 2) `-prof-gen` (pass 1) `-ipo` (pass 2)
  `-O3` (pass 2) `-no-prec-div` (pass 2) `-prof-use` (pass 2)
  `-auto-ilp32` `-ansi-alias`

- `470.lbm`: `basepeak = yes`

- `482.sphinx3`: `basepeak = yes`

### C++ benchmarks:

- `444.namd`: `-xCORE-AVX2` (pass 2) `-prof-gen` (pass 1) `-ipo` (pass 2)
  `-O3` (pass 2) `-no-prec-div` (pass 2) `-prof-use` (pass 2)
  `-fno-alias` `-auto-ilp32`

- `447.dealII`: `basepeak = yes`

- `450.soplex`: `basepeak = yes`

- `453.povray`: `-xCORE-AVX2` (pass 2) `-prof-gen` (pass 1) `-ipo` (pass 2)
  `-O3` (pass 2) `-no-prec-div` (pass 2) `-prof-use` (pass 2) `-unroll4`
  `-ansi-alias`

### Fortran benchmarks:

- `410.bwaves`: `basepeak = yes`

- `416.gamess`: `-xCORE-AVX2` (pass 2) `-prof-gen` (pass 1) `-ipo` (pass 2)
  `-O3` (pass 2) `-no-prec-div` (pass 2) `-prof-use` (pass 2) `-unroll2`
  `-inline-level=0` `-scalar-rep-`

- `434.zeusmp`: `basepeak = yes`

- `437.leslie3d`: `basepeak = yes`

- `459.GemsFDTD`: `-xCORE-AVX2` (pass 2) `-prof-gen` (pass 1) `-ipo` (pass 2)
  `-O3` (pass 2) `-no-prec-div` (pass 2) `-prof-use` (pass 2) `-unroll2`
  `-inline-level=0` `-opt-prefetch` `-parallel`

- `465.tonto`: `-xCORE-AVX2` (pass 2) `-prof-gen` (pass 1) `-ipo` (pass 2)
  `-O3` (pass 2) `-no-prec-div` (pass 2) `-prof-use` (pass 2)
  `-inline-cALLOC` `-opt-mALLOC-OPTIONS=3` `-auto -unroll4`

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SPEC CFP2006 Result

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Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes
436.cactusADM: basepeak = yes
454.calculix: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias
481.wrf: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.html
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.xml

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For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.2.
Originally published on 20 October 2015.